

## ANTHRAX SENT THROUGH MAIL GAINED POTENCY BY THE LETTER

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### Anthrax Sent Through Mail Gained Potency by the Letter

By WILLIAM J. BROAD and DAVID JOHNSTON

Deepening the mystery of the biological attacks that terrified the nation last fall, federal investigators have discovered that the [anthrax sent through the mail](#), in general, grew more potent from one letter to the next, with the spores in the final letter to be opened -- the one sent to Senator Patrick J. Leahy of Vermont -- the deadliest of all.

The finding has surprised and worried investigators, who say it poses a new riddle: was the culprit an amateur making gradual improvements through experimentation, a malevolent professional intentionally ratcheting up the potency of the germ powder, or someone else entirely?

It also suggests that after more than six months of painstaking effort, government experts investigating the anthrax strikes are still at sea. Part of the problem, they admit, is a lack of advisers skilled in the subtleties of germ weapons.

The discovery of the progressive potential deadliness of the anthrax is the latest conclusion of scientific testing that investigators are hoping will help crack a case that has baffled the F.B.I. since the first anthrax fatality: that of Robert Stevens ([case 5](#)), a photo editor at a Florida supermarket tabloid, who died on Oct. 5.

With five anthrax deaths linked to the contaminated mailings, the F.B.I. inquiry has consumed millions of hours of interviews, neighborhoodsweeps and other detective work. For example, F.B.I. laboratory analysts matched the serrated ends of the strips of cellophane tape used to seal the anthrax letters. That meant that whoever sealed the letters, without leaving any fingerprints, tore off successive strips of tape from the same roll, officials said.

But investigators acknowledge that they still have no idea who is behind the tainted letters. So they are increasingly turning to science to unravel the mystery. Tests being conducted at several private laboratories may reveal the precise biological signature of the anthrax used in the mailings, helping to narrow the search for the laboratory from which it came.

Analyses of the anthrax sample and the chemicals used to coat it could leave telltale clues to the techniques and equipment used to manufacture the germ material.

Investigators previously believed that the anthrax sent to Mr. Leahy, the Democrat who is chairman of the Senate Judiciary Committee, and Tom Daschle, the Senate majority leader, were identical in strength. Each letter was mailed from Trenton on Oct. 9, 2001. Each had the same photocopied message inside.

But it turns out that the Leahy anthrax is finer, its spores having a smaller range of particle sizes, officials familiar with the federal investigation said.

"It could be that the final steps of the processing were done in steps," a senior government official said. "You take it so far, and take off a bunch. You go further, and take off another bunch."

Despite the increasing sophistication of the anthrax, investigators say they still judge that the deadly powder could have been made in any of thousands of biological laboratories, though getting the right starter germs would have been difficult.

An aide to Senator Daschle opened the letter on Oct. 15, and officials quickly warned that its anthrax was of high quality compared with earlier mailings, to news media offices in New York. The Leahy letter was impounded, along with all other Congressional mail, and was not discovered until Nov. 16. Investigators made painstaking safety and forensic preparations before opening it in early December.

The analysis of the contents of the Leahy letter is proceeding slowly, the investigators say, because they are learning the science as they go along and want to make sure that none of the scarce, lightweight but extremely valuable evidence is lost, corrupted or misinterpreted. They are getting help, they say, from scores of scientists across the nation.

"We'll have to take this into court," the law enforcement official said of the evidence. "We had to assure ourselves that we had a quality program."

A senior Bush administration official expressed sympathy for the F.B.I. because the inquiry had grown so scientifically complex and knowledgeable advisers are so few.

"They're having to review a lot of the initial takes on things," the official said. "There's an evolving picture. The bureau has gone back to scratch to invent the science."

It is sometimes hard even to do reappraisals. In the Florida case, no letter or residual powder was ever recovered, leaving many questions about the anthrax there.

Federal officials said the first wave of well-documented attacks with mailed anthrax -- in [letters from Trenton](#) postmarked Sept. 18 to NBC News and *The New York Post* -- was relatively crude. The powder was heavily contaminated, they said, with what biologists call vegetative cells -- anthrax bacteria before processing in the laboratory turns them into hardened spores. Vegetative cells in dry anthrax powder are generally dead and therefore harmless, experts said.

By contrast, the tiny spores live in a dormant state. Individual ones are light enough to float easily in the air and, if inhaled, small enough to reach deep into human lungs, eventually germinating into bacteria and causing the respiratory form of the disease, which can be fatal. They can also cause the less dangerous cutaneous form if rubbed into the skin.

Last October, alarm bells rang when the Daschle powder was found to be nearly pure spores. The danger was driven home when nasal swabs came back positive for 28 people in the Senate Hart building, where the letter was opened.

The F.B.I. in early November characterized the Daschle powder as "much more refined, more potent, and more easily dispersed" than the New York media anthrax. The mailer's letters hinted at the danger. The media ones warned the openers to take penicillin. But the Daschle letter said flatly, "You Die Now."

As federal experts investigated the residual Daschle sample, they found the picture becoming fuzzier. On one hand, the concentration of the anthrax was extraordinarily high -- roughly equal to that made in the abandoned American germ weapons program, a trillion spores per gram.

But federal experts now say the particles turned out to have a large size range. While single spores predominated, the experts said, some Daschle clusters ranged up to 40 microns wide -- far too big to penetrate human lungs. A micron is one-millionth of a meter, and a human hair is 75 to 100 microns wide. The big clusters suggested the powder was far less than weapons grade.

Private experts disagree on just how much less. Ken Alibek, a former Soviet germ official who is now president of Advanced Biosystems, a consulting company in Manassas, Va., called the Daschle anthrax mediocre.

"It was not done with a regular industrial process," Dr. Alibek said in an interview. "Maybe it's homemade."

Recipes that antigovernment militia groups circulate at gun shows might suffice to make the deadly powder, he said.

But William C. Patrick III, a scientist who made germ weapons for the American military and is now a private consultant on biological defense, rated the Daschle anthrax as 7 on a scale of 10.

"It's relatively high grade," Mr. Patrick said, "but not weapons grade."

In addition to particle size, federal experts are investigating whether the anthrax powders have electrostatic charges that affect dispersal and chemical coatings meant to increase potency and shelf life.

Federal investigators saw the Leahy anthrax as an opportunity to clear up ambiguities and deepen the analysis. Since no powder had been lost in the letter's opening, they had more to work with.

Still, the amount, typical of the tainted letters, was remarkably small -- just 0.871 grams. A pat of butter weighs 10 grams.

Last week, government officials said the most recent analyses showed that the Daschle and Leahy powders were quite different, the latter finer and more uniform.

"You can characterize the Leahy as having a smaller particle range," one official said.

In general, he added, the ability of federal investigators to do deeper analyses because of the relatively large amounts of powder in the Leahy letter is producing "real interesting results."

A biologist aiding in the investigation said the increasing potency of anthrax in the letters might suggest that the attacker was a thief who stole several samples.

"Maybe he didn't pocket one vial but two or three, if we're assuming this was an opportunist," this scientist said.

Dr. Alibek raised another possible factor. The F.B.I., he said, needed to weigh the possibility that post office sorting machinery might have had an effect. "It could be an additional process of milling," he said, "like a mortar and pestle."

Experts said the Daschle and Leahy letters, starting at the same place in New Jersey on the same date and ending up at the same destination in Washington, appear to have taken similar if not identical postal routes. Dr. Alibek agreed but said the same sorter could apply more pressure to one letter than another. He added that the overall grade contrasts were probably caused by "different batches of the product, one more sophisticated than the other."

Investigators have also been studying the envelopes, officials say, and have found that the paper had very large pores -- up to 50 microns wide. That is bigger than the largest Daschle anthrax clusters and suggests how the powder could easily escape individual letters to contaminate the general mails.

"It had to be one of the most porous materials," an official said of the attack envelopes compared with standard ones. "Whether that was by chance or design, I have no idea."